TAB

DIA review(s) completed.

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ESTIMATED CASUALTIES (JCS TARGETS) - NORTH VIETNAM (U)

TARGET (JCS #)	STRIKES THRU	CIVILIAN		MILITARY	
		WARNED	UNWARNED	WARNED	UNWARNED
2	16 Feb 66	1	10	12	120
5	30 June 65	5	50	5	45
10	30 Sep 65	4	55	0	0
11	10 Aug 66	1	5	0	0
14	29 May 66	9	90	0	0
16	14 July 66	1	10	0	0
18.1	11 Feb 66	1	10	0	0
18.11	Mar 66	3	30	0	0
18.12	15 Dec 65	5	50	0	0
18.13	10 Apr 65	6	60	0	0
18.14	9 Apr 65	5	50	0	0
18.15	26 Apr 66	2	20	0	0
18.16	27 May 65	1	5	0	0
18.17	6 June 65	1	10	0	0
18.19	16 Apr 65	1	5	5	54
18.2	28 June 65	6	60	0	0
18.21	17 Apr 66	4	40	0	0
18.22	8 Aug 66	2	20	0	0
18.23	4 July 66	1	10	0	0
18.24	20 July 66	1	5	0	0
18.27	5 May 66	2	20	0	0
18.31	30 Oct 65	3	25	0	0
18.32	16 July 65	1	10	0	0
18.33	24 July 66	60	120	0	0
17	19 Apr 66	1	5	0	0

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18.36	21 July 66	5	50	0	0
18.47	20 Apr 66	1	3	0	0
18.49	23 Apr 65	1	10	0	0
18.5	29 July 66	3	30	0	0
18.51	16 Apr 65	3	30	0	0
18.52	12 July 66	1	10	0	0
18.53	22 Mar 66	1	10	0	0
18.54	28 Apr 66	14	140	0	0
18.55	5 Mar 66	1	10	0	0
18.58	16 Nov 65	0	4	0	0
18.6	30 July 66	1	5	0	0
18.61	19 Dec 65	6	60	0	0
18.63	8 Aug 65	1	10	0	0
18.64	29 July 65	0	5	0	0
18.66	21 June 66	1	60	0	0
18.69	16 Apr 66	2	20	0	0
18.74	7 Oct 65	5	45	0	0
18.8	2 July 66	8	80	0	0
18.9	8 Aug 66	1	5	0	0
21.1	1 May 66	15	100	0	0
21.11	22 May 66	42	420	0	0
25	8 Mar 66	3	30	36	357
26	21 Feb 66	14	140	126	1260
28	5 Nov 65	1	5	70	700
29	26 July 65	1	10	45	450
33	27 July 65	3	30	29	290
39	10 June 65	2	15	14	144
18.75	5 Oct 65	20	40	0	0

39.1	28 June 65	0	2	41	414
39.11	8 Nov 65	0	2	20	200
39.12	9 Aug 65	22	220	50	500
39.13	21 May 65	1	10	25	250
39.15	29 June 65	1	5	6	64
39.19	12 June 65	3	30	1	6
39.2	22 Mar 66	6	60	13	132
39.24	12 May 66	1	5	12	120
39.27	4 Apr 66	2	20	18	184
39.34	17 June 66	15	150	28	283
39.36	27 Apr 66	1	5	5	50
39.39	26 Oct 65	1	3	10	96
44	June 66	2	20	92	920
47.2	8 Aug 65	2	15	1	6
48	2 Aug 66	4	40	1	9
49	29 June 66	8	80	1	10
50	9 June 66	1	10	0	2
51	18 Aug 66	2	15	7	72
51.11	11 Aug 66	1	10	0	0
51.12	15 Sep 65	4	40	0	0
51.13	10 Aug 66	2	20	0	0
51.14	19 July 66	1	10	0	0
51.16	21 July 66	40	80	2	16
51.17	17 Aug 66	1	3	0	1
52	21 Apr 66	7	70	51	505
55	17 Apr 66	1	10	3	33
56	22 June 65	6	60	60	600

63.13	9 Oct 65	1	5	10	104
68	24 Apr 66	11	110	0	0
69	6 Aug 66	5	50	1	8
71	1 Feb 66	8	80	0	2
71.1	5 Apr 66	10	100	14	136
74AX	25 Apr 66	4	40	8	80
74.1	25 Apr 66	2	20	4	40
82	11 Aug 66	8	80	0	0
82.11	15 Mar 66	12	120	0	3
82.15	30 Aug 65	17	170	0	0
82.17	July 66	1	10	0	0
	TOTAL	497	3989	826	8266

NOTES:

1. Column 2 is the date of the last strike against target on which a BDA report was submitted.

2. Columns 3 and 5 assume that early warning allowed population ample time to take protective measures.

3. Columns 4 and 6 assume no protective measures taken by population in target area.

TAB

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Estimated Civilian Casualties for Non-JCS Targets (Peripheral Areas) (U)

(DIAAP-1K2 Files)

NAME	COORDINATES	DATE OF PHOTOGRAPHY	STRUCTURES DESTROYED	CASUALTIES WARNED	CASUALTIES UNWARNED	REMARKS
Pho Ca Ba Port Facility	20-43-18N/107-03-13E	29 Sept 66	30	7	70	
Duc Tho Storage Area	18-32-30N/105-35-30E	18 Aug 66	65	45	150	
*Ninh Binh Brks/Storage	20-15-25N/105-58-57E	17 Sept 66	315	47	470	
Xom Don Dien Brks/Supply	19-02-59N/104-52-48E	16 Jun 66	90	23	230	
Ban Lot Army Bks	21-12-35N/104-03-10E	11 Nov 65	5	1	10	
Ban Lot Army Bks	21-11-51N/104-06-21E	23 Dec 65	58	15	150	
*Xom Trung Hoa Hwy Bridge	18-42-29N/105-27-00E	18 Sept 66	4	1	10	
*Thi Long RR Br/Bypass	19-31-50N/105-42-50E	9 Oct 66	33	8	80	
*Ha Thon RR/Hwy Br	20-12-30N/105-58-10E	29 Sept 66	8	2	20	
*Pho Hop RR Br	21-49-09N/104-45-39E	8 Oct 66	13	2	40	
*Dong Thon RR Siding	20-19-47N/106-04-58E	17 Sept 66	66	13	160	

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NAME	COORDINATES	DATE OF PHOTOGRAPHY	STRUCTURES DESTROYED	CASUALTIES WARNED	CASUALTIES UNWARNED	REMARKS
*Thinh Lac RR Br	19-40-05N/105-22-46E	20 Sept 66	8	2	20	
Qui Vinh RR Siding	19-15-59N/105-41-48E	14 Jun 66	25	6	60	
Tho Trang RR Yard/Bridge	19-09-20N/105-37-50E	24 Jul 66	4	1	10	
Phu Tho RR Yard	21-24-05N/105-13-35E	4 Jul 66	5	1	10	
Bai PR Yard	21-42-15N/104-53-04E	23 May 66	50	12	120	
*Thanh Hoa RR Yard	19-48-40N/105-46-15E	18 Aug 66	15	4	40	
Nam Dinh RR Yard	20-25-20N/106-09-50E	15 Jun 66	8	2	20	
My Ly RR Siding	18-53-47N/105-36-15E	22 May 66	2	1	10	
*Kime Tam POL	19-23-19N/105-45-09E	15 Sept 66	3	1	10	
POL at Badon Bks	17-45-08N/106-26-12E	2 Sept 66	48	30	120	
Vinh POL Dump	18-40-20N/105-40-53E	11 Jun 66	30	8	80	
*Yen Hau POL Storage	19-08-35N/105-33-52E	12 Oct 66	3	1	10	
*Dao Quan E POL	21-26-14N/106-12-25E	4 Sept 66	63	12	160	

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NAME	COORDINATES	DATE OF PHOTOGRAPHY	STRUCTURES DESTROYED	CASUALTIES WARNED	CASUALTIES UNWARNED	REMARKS
*Dao Quan W POL	21-25-30N/106-11-55E	4 Sept 66	19	7	50	
*Dong Giap POL	18-24-32N/105-53-05E	8 Aug 66	2	1	10	
Thai Nguyen POL	21-36-15N/105-48-25E	20 July 66	9	2	20	
*Tuc Tranh POL	19-46-25N/105-48-37E	5 Oct 66	18	4	40	
Tri Binh POL	19-46-56N/105-32-55E	4 Sept 66	1			
Hanoi SAM Site C-30-2	21-13-00N/105-21-45E	29 July 66	12	3	30	
Nghia Lo AF	21-35-57N/104-30-21E	12 Jan 66	75	19	190	
Hanoi SAM Site D-36A-2	21-35-09N/105-50-06E	25 July 66	5	1	10	
Yen Bai Complex	21-41-33N/104-52-50E	31 May 66	Area clobbered by CBU-24, large number of bldgs destroyed - no count made		750	
Sop Cop Area	20-53-36N/103-37-08E	25 Apr 66	9	2	20	
*Thanh Hoa Complex	20-49-40N/105-47-20E	22 Sept 66	355	89	890	
Dai Thuy RR Br	19-22-00N/105-43-08E	21 Sept 66	25	6	63	

NAME	COORDINATES	DATE OF PHOTOGRAPHY	STRUCTURES DESTROYED	CASUALTIES WARNED	CASUALTIES UNWARNED	REMARKS
POL at Phuc Loi	18-43-25N/105-44-45E	4 Sept 66	28	9	90	
Nam Dinh POL	20-26-50N/106-13-14E	26 Aug 66	1	—	3	
Xom Ve POL	17-53-42N/105-49-49E	11 Sept 66	2	—	5	
Phu Ly Complex	20-32-50N/105-55-15E	11 Oct 66	168	42	420	
		TOTALS	1980	456	4096	

*Indicates civilian casualties have been reported.

TAB

NVN Casualty Estimates (U)

The procedures used to estimate civilian casualties in target peripheral areas in North Vietnam, resulting from U.S. aerial bombing, are based on World War II data contained in the U.S. Strategic Bombing Survey of March 1947. World War II bombing of Japan caused 551,419 casualties of which 252,769 were fatalities. Seventy-four percent of all bombs dropped were of the incendiary variety to cause secondary type fires. A total of 2,094,374 civilian type buildings were destroyed by these bombings. The Japanese populace expected their built-up urban areas to be struck and their warning system was so developed to provide adequate early warning.

The civilian housing existing in North Vietnam is considered to be nearly equivalent to that found in Japan during World War II. The North Vietnamese are equally aware of likely U.S. bombing targets, but, as many of the targets are comparatively isolated, the Vietnamese warning system may not be as effective as the Japanese system. In North Vietnam, however, fewer incendiary type bombs have been dropped and targets are more removed from the more densely populated areas. Overall, it is considered reasonable to base estimates of North Vietnamese casualties on the Japanese World War II ratio. Thus, one may expect 0.263, or about 0.25, casualties per civilian structure destroyed.

The above procedures are considered applicable for a warned condition. No experience data exists for a primarily unwarned condition but it is estimated that casualties would be increased by a factor of ten. The 10:1 ratio follows from the fact that the MAE's for unwarned personnel are about ten times as

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great as those for warned personnel. This is based on the following assumptions: (a) 50% of the unwarned personnel are prone in the open; 50% are in residential buildings (b) warned personnel have protection equivalent to that of a fox-hole or trench; thus, for warned personnel the MAE's are equivalent to the crater area.

A sample calculation of estimated casualties based on the above follows: Three strikes against a dispersed POL facility destroyed 88 civilian type structures in a village located 1/2 nm SE of the target area. Thus, 0.25 x 88 = 22 casualties for a warned condition. Applying the 10:1 ratio for unwarned/warned conditions we estimate 22 x 10 = 220 casualties for an unwarned condition.

1 Appendix
Casualty Prediction Methodology
for Targeted Areas (U), (S), 1 cy

APPENDIX A

Casualty Prediction Methodology for Targeted Areas (U)

The CEP of 200 feet was agreed upon as suitable for SEA area by steering committee comprised of military personnel from the three services. Demographers were furnished with photos with targeted areas delineated. As all bombs dropped should theoretically fall within 3 CEP's of the aiming point, or points, an area ("spillover" area) was also delineated around the targeted area 600 feet (3 x CEP of 200') from target area border. Demographers furnished number of civilians within the targeted area and density (in people per million square feet) in the "spillover" area.

To estimate the probable maximum number of civilian casualties within the targeted area, multiply the number of civilians at risk by the ratio of the total average lethal area of bombs impacting within the targeted area to the total targeted area, taking into account weapons which may overlap in effects. To estimate the probable maximum civilian casualties in the "spillover" area find the total average lethal area of the bombs impacting in the surrounding area in millions of square feet and multiply this by the density (in people per million square feet).

After the 94 targets in the system had been thoroughly calculated as to casualties it was determined that when weapons were applied to achieve a 30% level of damage the casualties within the target were generally 60% and those in the spillover area 10%. For later targets this rule was used to calculate expected casualties.

When making the actual calculations it was assumed that one-half of the populace would be in buildings and one-half in the open. It was further assumed that those in the open were in a prone position for

selection of lethal area. Also an estimation was made of how much of any particular area (target or spillover) was built-up and how much open. Weapons detonating in the open and on buildings were thus calculated and these numbers used accordingly.

When arriving at casualties for a warned daylight condition 10 percent of those calculated for an unwarned condition were given, as the lethal area for people in trenches, foxholes and protective shelters [illegible] mostly 10% of the average used in the unwarned condition.